Claims

1. A palladium catalyst consisting of a support and

from 0.05 to 2.0% by weight, based on the supported catalyst, of palladium and from 0.035 to 5.2% by weight, based on the supported catalyst, of lanthanum,

or

from 0.05 to 2.0% by weight, based on the supported catalyst, of palladium, from 0.02 to 1.0% by weight, based on the supported catalyst, of titanium and from 0.0002 to 7.4% by weight, based on the supported catalyst, of potassium,

or

from 0.05 to 2.0% by weight, based on the supported catalyst, of palladium and from 0.045 to 1.8% by weight, based on the supported catalyst, of niobium,

or

from 0.05 to 2.0% by weight, based on the supported catalyst, of palladium, from 0.035 to 5.2% by weight, based on the supported catalyst, of lanthanum and from 0.0001 to 0.065% by weight, based on the supported catalyst, of silicon.

2. A process for preparing a palladium catalyst according to claim 1 by impregnating a support in tetra amine palladium hydroxide aqueous solution followed by drying and calcination and impregnating the support with precursor solutions containing precursors of the further metals.

3. A process according to claim 2, wherein the Pd-La-, Pd-Ti- or Pd-Nb-catalyst is prepared by impregnating the Pd-catalyst in corresponding precursor solution followed by drying and calcination.

4. A process according to claim 3, wherein a Pd-Ti-K-catalyst is prepared by impregnating the Pd-Ti-catalyst in potassium precursor solution followed by drying and calcination.

5. A process according to claim 2 or 3, wherein a Pd-La-Si-catalyst is prepared by Si-CVD on a Pd-La-catalyst, pre-reduced at 350 to 700°C, followed by oxidation at room temperature.

6. A process according to claims 2 to 5, wherein the producing of the catalysts includes the reduction process at 300 to 600°C for 1 to 5 hours.

7. A process according to claims 2 to 6, wherein the La-precursor is lanthanum nitrate hydrate, the niobium precursor is tetrakisniobium (?) and the titanium precursors are chosen from a group consisting of $Ti(O\text{-}iPr)_2(DPM)_2$, titanium ethoxide, titanium oxide acetylacetonate and titanium butoxide.

8. A process according to claim 4, wherein the K-precursor is potassium nitrate.

9. A process according to claim 5, wherein the Si-precursor is chosen from the group consisting of tetrahydrosilane, triethylsilane, tripropylsilane and phenylsilane.

10. A continuous process for the selective hydrogenation of acetylene to ethylene in the presence of a catalyst according to claim 1, wherein 0.5 to 2.0% by weight of acetylene in ethylene/acetylene gas mixture is used, the reaction temperature is 30 to 120 °C and the flow rate of the gas mixture is 200 to 2500 ml/min×g catalyst.

11. The use of a palladium catalyst as defined in claim 1 in the selective hydrogenation of acetylene.